Hybrid vehicles are here now. They operate on two fuel sources, most commonly gasoline in an internal-combustion engine and electricity stored in a battery. The Toyota Prius and Honda Civic are two such models already on the market. Other makes and models are scheduled for production within the next three years. Hybrids are efficient in their gasoline consumption because they run on electricity except when additional power is necessary, at which point the internal combustion engine kicks in. Industry experts expect hybrid vehicle sales to accelerate sharply in the next few years. By 2008, it is estimated that hybrids will account for 2 percent of all vehicle sales.

GM Hy-wire

Toyota Prius

Hybrid Launch Dates

Make/Model	Date	Make/Model	Date
Honda Insight	1990	Honda Accord	2005
Toyota Prius	2000	Lexus RX400	2005
Honda Civic	2002	Toyota Camry	2005
Chevy Silverado	2004	Toyota Highlander	2005
GMC Sierra PU	2004	Nissan Altima	2006
Ford Escape SUV	2005	Chevy Malibu	2007

Hydrogen fuel cell vehicles obtain electrical energy from the chemical process of separating oxygen atoms from hydrogen atoms. In its pure form, the only waste product created by the process is warm water. However, most fuel cells currently being developed require another energy source to drive the chemical separation, such as an internal combustion engine. But that may not always be the case. In May 2003, a drivable, engine-less fuel cell prototype called the Hy-wire was introduced by General Motors. It runs on compressed hydrogen and transmits energy to the drive train by electrical wire, rather than by mechanical linkages.

Emerging Directions

- In order to build the new systems and capacity expansions needed to support growth, new financing strategies will be needed. Regional approaches, such as the Regional Transportation Investment District (RTID) of Puget Sound, show promise if voters will support regional funding sources to augment state transportation funding.
- Pricing approaches also show promise to supplement traditional transportation funding, especially in congested corridors.
- As ITS technologies continue to be developed, such as smart vehicles and smart roads, Washington needs to be on the forefront of adapting the transportation system to make sure that the benefits of these innovations are accessible to drivers, including commercial drivers who make their living on the roads.
- The anticipated shift from petroleum-based fuels to alternative fuels requires Washington to adapt the current transportation funding system. Innovative and fair strategies for meeting future system needs must be devised and implemented.

The Washington State Transportation Commission and the Washington State Department of Transportation are in the process of updating the Washington Transportation Plan. This long range plan is based on data analysis and is focused on ten issues: System Preservation, System Efficiencies, Safety, Transportation Access, Bottlenecks and Chokepoints, Economy and Jobs, Moving Freight, Future Visions, Health and Environment and Funding and Governance. This plan will shape future transportation budget proposals.

For more on this topic: **www.wsdot.wa.gov/planning/wtp**

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Future Visions

What are the visions of transportation system futures - shared and unshared - that should shape today's transportation planning to help create pathways to the future?

There are a lot of visions for the future of transportation in Washington that come from all levels and perspectives - some are beyond our grasp (either by just a little or sometimes by a lot), and some are within sight (sometimes clearly, and sometimes more distantly). Some are clearly needed – some are less justified. Given that Washington's population is still growing, it is important to think today about shaping the future, even though current funding is tight.

Adding New Systems

New types of transportation are being pursued to provide alternatives to driving and to support growth management plans at the local and regional level.

High Capacity Transit
A high capacity transit vision is starting to unfold in Washington. Sound Transit's Tacoma Link light rail is now operating in downtown Tacoma. The first 14-mile segment of the Seattle Link light rail is under construction between downtown Seattle and Tukwila, with a second phase being planned. The light rail system vision lays out proposed connections across Lake Washington to Bellevue and Redmond and extensions north to Everett and south to Federal Way. Sound Transit commuter rail is now operating from Tacoma to Seattle and from Everett to Seattle, with expanded service under development. Sound Transit Express buses are also operating on major freeway corridors throughout the Puget Sound region, and a series of direct access ramps are being constructed to improve transit access to park and ride lots from HOV lanes.

In Portland, the TriMet MAX light rail system has four lines operating, two of which approach Clark County in the I-5 and I-205 corridors. The Vancouver area is considering high capacity transit in Clark Courty and connections across the Columbia River into Oregon. In Spokane, preliminary planning has been done for a light rail line from the Spokane Valley to downtown Spokane.

Washington State Department of Transportation

Washington State Transportation Commission

Direct Access Ramp I-90 at Eastgate

Supporting this high capacity transit vision is the 300-mile HOV lane system in the Puget Sound region, with over 200 miles already constructed within congested freeway corridors. This HOV system is supported by a broad network of park and ride lots, an extensive vanpool fleet, and demand management programs aimed at encouraging transit alternatives. Transit-oriented developments – land uses that provide densities, mixed uses, and pedestrian facilities to build a walk-to market for transit have been built in Bellevue, Issaquah, Dupont, Vancouver, and throughout the city of Seattle, and are being planned along the light rail and other transit corridors.

Monorail

Extension of Seattle's vintage monorail line was approved by voters in November 2002. Phase I will build the Green Line, which runs 14 miles from Ballard to downtown Seattle and from West Seattle to downtown Seattle. Future phases of the monorail are intended to connect other parts of the city.

High Speed Intercity Passenger Rail

Washington has a vision for high speed intercity passenger rail in the federally-designated Pacific Northwest Rail corridor which runs from Eugene, Oregon, through Portland and Seattle to Vancouver, British Columbia.

Amtrak Cascades Daily Roundtrip Trains

Total Trains	1994	2003	Mid-point	2023
Portland, OR to Seattle, WA	1	3	8	13*
Seattle, WA to Vancouver, BC	0	2**	3	4

**Includes three trains which travel north, beyond Seattle, to Vancouver, BC.*
***Amtrak Cascades #513/516 travels between Seattle and Bellingham.*

This service is being incrementally implemented through track, signal, and rolling stock improvements to increase speeds and frequencies. The Amtrak *Cascades* currently provides three roundtrips per day between Seattle and Portland, and two roundtrips per day north of Seattle (one to Vancouver, B.C., and one to Bellingham). The lack of a stable source of state multimodal funding, and to date little federal support, has slowed the implementation of this vision and is leading WSDOT to reassess it's high speed intercity passenger rail plan.

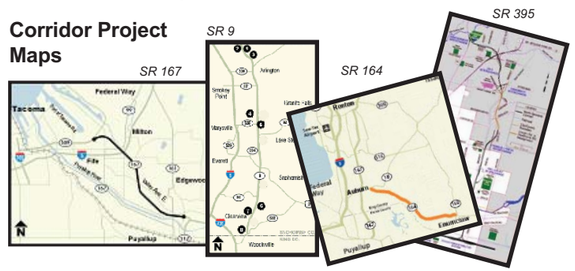
Major Roadway Capacity Expansions

With the population and job growth experienced in the past 20 years, which is projected to continue, Washington's roadway capacity is inadequate to meet the growing demand. WSDOT's highway system plan has identified over $30 billion of unfunded capacity expansion needs on state highways, and regional plans have identified large additional expansion needs on city and county arterials.

Major corridor expansions have been planned for the I-405 corridor in East King County, SR 167 in South King County, and SR 522 and SR 9 in Snohomish County. A new north/south corridor as part of SR 395 has been planned in Spokane, with the first segment under construction. Highway missing links, including SR 509 south of SeaTac Airport, SR 167 from the Port of Tacoma to Puyallup, and SR 704 Cross-base Highway in south Pierce County, are also part of the state's expansion plan. In Vancouver, there is a need for an expanded I-5 Columbia River Bridge, with planning proceeding jointly between Oregon and Washington.

Capacity needs exist across the state, including SR 28 in East Wenatchee, SR 17 in Moses Lake, SR 101 in Olympia, SR 539 in Bellingham, and SR 240 in the Tri-Cities. In the Puget Sound region, growing delay is affecting regional highways such as SR 202 east of Redmond, SR 169 in Maple Valley, SR 164 from Auburn to Enumclaw, SR 162 in Pierce County, SR 524 in Snohomish County and others. Local arterial expansion plans to meet growth needs are numerous, including Myra Road in Walla Walla, Stevens Drive in Richland, Valley Mall Boulevard Extension in Yakima, and Schurman Way Extension at the Port of Woodland.

Corridor Project Maps



Changes in How Freight is Moved

Intermodal Logistics Parks

Freight capacity is being expanded by development of intermodal efficiencies and connections. Burlington-Northern Santa Fe Railroad (BNSF) is developing rail-truck Intermodal Logisitic Parks. Recognizing the shift from a manufacturing economy to a warehouse and distribution economy sparked development of this concept of offering multimodal transportation choices in major regional markets. BNSF is developing a "four corner" nationwide strategy with one location in the Pacific Northwest.

Short Sea Shipping

Short sea shipping is a future intermodal shipping concept that would transport freight via barge or container ship for short-hauls over water in lieu of highway or rail movements that might be delayed by congestion. The water-borne freight would bypass the most congested land areas and be picked up by truck or rail to complete its journey.

Intelligent Transportation Systems – Smart Vehicles and Smart Roads

Intelligent Transportation Systems (ITS) technology is rapidly evolving and includes such things as smart vehicles and smart roadways. Imagine having a vehicle that can sense the location of other vehicles on the road and activate variable cruise control and collision avoidance systems. A non-connected train of vehicles such as these, all communicating directly with each other, will allow them to safely travel at close distances and high speeds, while improving current highway system efficiency. Vehicles outfitted with smart technologies are starting to enter the marketplace, such as the On-Star navigation system.

Smart road technologies are being put into place as quickly as they can be developed and funded. In the future, roads across the state will feature such things as variable speed limits, customized traveler information delivered directly to a traveler's car or personal digital assistant (PDA), interaction between arterial traffic signals and ramp meters, special time-saving features for transit, and automated maintenance devices that protect worker safety, such as remote control traffic cones.

There are also ITS technologies designed to meet the special needs of truckers. Roadside weigh stations have traditionally performed a number of inspection and enforcement functions, including weighing of trucks, safety inspections, and license and operator credential checks. But waiting in line at a weigh station adds time (and therefore expense) to the trucker's trip. The Commercial Vehicle Information Systems and Networks (CVISN) and Weigh-In-Motion (WIM) system embedded in the roadway about a half-mile before a weigh station weighs each truck passing over it. At the same time, trucks equipped with an Automatic Vehicle Identification (AVI) transponder electronically transmit essential safety rating credentials, weight, size, and other information to the weigh stations.

CVISN/WIN System

The data is instantly checked and if no problems appear, the truck can bypass the station and continue down the highway. Within the next four years all interstate weigh stations should be converted to this technology. Up to now WSDOT has applied an incremental approach to CVISN. The ultimate vision is paperless permitting and tracking and data sharing within a national system. International border crossing applications of this technology are underway with a pilot project for sealed cargo containers.

Tolling Technologies

System pricing strategies show promise as a way to increase traditional transportation funding, especially in congested corridors. Also known as congestion pricing, these concepts include

- System-wide tolling, where fees are based on actual road use throughout the entire system. "Dynamic Pricing" (variable pricing based on demand) may be applied in this form of congestion pricing.
- Segment tolling, such as traditional, limited-access toll roads or toll express lanes. Advances in electronic toll collection now provide for "at speed" (no tollbooth) collection of tolls.
- Cordon tolling, where all drivers are charged a toll when entering an area, such as a downtown district.
- High-Occupancy-Toll (HOT) lanes, where single-occupant vehicles can pay to use High-Occupancy Vehicle (HOV) lanes when there is available capacity. Almost 20 different projects using or studying HOT lane applications are currently underway in the United States.

Systemwide Tolling

New Fuels

Fluctuating world petroleum markets causing price increases and concern about environmental pollution are focusing attention on alternative fuels. Non-petroleum energy sources include biodiesel, ethanol, natural gas, electricity, propane and hydrogen. Alternative fuel development will likely become a significant factor in the second decade of this century.